

# Our Experience in Oral Treatment of Handicapped Children and Young People by the Application of General Anaesthesia

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## Summary

*Because of the low level of dental care for handicapped children in the Split-Dalmatian district systematic training of staff and procurement of space and equipment was initiated during the 1970s.*

*The majority of the population treated consisted of handicapped children and young people, in relevant institutions or with their families, mainly from this area.*

*A team of specialists, consisting of a pedodontist, oral surgeon, anaesthesiologist and co-workers usually performed dental treatment. When necessary they were joined by other dental specialists.*

*All our patients were treated under general inhalation anaesthesia with the necessary clinical and laboratory tests and written consent of the families or guardians. During a period of twenty years 680 patients were treated.*

*We treated three patients on average in one operative day. Initially the operations were conservative-prosthetic operations, and later this changed to more frequent conservative-restorative procedures.*

*From our experience we consider that the method of endotracheal anaesthesia is particularly suitable for handicapped children and young people.*

**Key words:** *dental care of the handicapped, general anaesthesia in dentistry.*

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## Introduction

First experience in the Split-Dalmatian district in providing dental care for handicapped children and young people goes back as far as 40 years, since the founding of the Dental High School in Split. Namely, at that time some mild cases of psychophysical impaired development were occasionally treated and some were reported in professional journals (1-3).

We registered a similar or higher level in other areas of this country (4-7) and in neighbouring countries (8, 9). In contrast to us some countries have already organised special associations with the purpose of improving the care of oral health in handicapped children and young people. The first extensive studies in world literature on handicapped persons with regard to dentistry are linked with the names Album, Brauer, Cohen, Castaldi and Wagner (10).

After noticing the low level of dental care for such children and young people, both because of traditional graduate training and because of the poor equipment in our dental clinics, expert training of staff was commenced (11, 12). From 1969 to 1979 a group of young professionals from this region, with high and middle professional education were trained to perform the most complicated operations in the oral cavity, which are most frequently the case in handicapped children and young people. At the same time new premises and modern equipment were made available, without which care of such complicated casuistics is impossible.

From 1979 we began providing dental services for the most severe forms of psychophysical impaired development (13) in hospital conditions (ENT Department of the Clinical Hospital "Firule", Split). Since December 1982 we have provided dental care under general anaesthesia in the Dental Polyclinic DZ "Dr. Petar Vitezica" in Split, and today in the same premises of the Dental Polyclinic in Split.

General anaesthesia is a reversible condition of controlled unconsciousness (cit. Arko) (14), or it could be described as a procedure for removal of functional activities of higher centres of the central nervous system, in which the patient loses contact with his/her surroundings and is not in a condition to maintain unobstructed passage through the respiratory airways.

Its beginning is linked with the name C. Long, 1842, H. Wells, 1844 and William Morton, 1846, who with the knowledge of his predecessors and his own experience succeeded in publicly demonstrating in the Boston Hospital "Massachusetts" by extracting a diseased tooth from a patient under ether anaesthesia (15). Since then this method has been continually improved (16-18).

### Material and method of work

The population that we treated over the 20 years consisted of children and young people from the Institute for the Placement and Rehabilitation of Children and Young People, Vrlika, Centre for Training and Education "Juraj Bonaći" in Split, Centre for Work Therapy and Rehabilitation, Kaštel Novi-Rudine, Centre for Rehabilitation "Samari-

tanac", and children living with their parents and guardians in the Split-Dalmatian district and surrounding areas.

All the operations were carried out by a team of experts, which usually comprised a pedodontist and an oral surgeon, and when necessary an orthodontist, prosthetist and a specialist in oral diseases, teeth and a periodontist. An anaesthesiologist and anaesthesiological technician from the Clinical Hospital "Firule", Split, participated in the operations. They were assisted by one nurse from Oral Surgery and one from Children's Surgery.

The dental equipment used during treatment of our patients consisted of one mobile dental unit, which has a turbo-connection, a slow handpiece and shank, all aero-driven, and an atomiser for water and air. The water used during operations with this unit was distilled. We also had one powerful mobile aspirator, which we used to collect all the fluid used during work in the mouths of our patients, and also their saliva and blood after surgical interventions.

Apart from medical documents and essential clinical and laboratory tests, prepared by the responsible paediatrician or specialist in school medicine, we also requested written consent of the parents or guardian to perform the operation under general anaesthesia (Figure 1). The parents or guardian were warned that the children must not have eaten or drank in the previous 6 hours. After the operation a record of the short anaesthesia performed by the anaesthesiologist was attached to the documents.

All our patients were treated under general inhalation anaesthesia. We chose this primarily because of the excellent control of inhalation anaesthetic, because introduction into the organism and elimination from the same depends to a large extent on lung ventilation. Thus in this way the depth of anaesthesia and awareness of the patient is rapidly achieved by appropriate changes in the inspiratory concentration of anaesthetic.

Prior to the commencement of anaesthesia the physical and mental state of the patient was always assessed (Figure 2). This was based on a thorough examination and knowledge of all available test results, in order to decide whether anaesthesia is contra-indicated or whether it is possible after certain preparations had been made. Attempts were made

to learn from the parents or guardian what anaesthesia had previously been used for the children, and whether there were any specifics in connection with anaesthesia.

During examination of our young patients we paid particular attention to certain characteristics which could cause difficulty during anaesthesia. Thus, for example, in subjects with a short, thick neck respiration obstruction can easily develop after loss of consciousness, and the introduction of an endotracheal tube in such individuals can be greatly hindered.

We obligatorily performed auscultation of the heart and lungs. Special attention was paid to the size of the mouth and tongue in relation to the mouth, the existence of loose teeth and protrusion of the teeth. We checked the ability to open the mouth, mobility of the neck (both extension and flexion), and the distance from the thyroid cartilage to the chin (normal three horizontal fingers when the head is in the neutral position). Furthermore, we checked the flow/passage through the nasal passages, particularly when nasotracheal intubation was planned.

Mental assessment and mental preparation of these specific patients is of great importance. They are children who are particularly attached to their homes, parents or guardian. On the basis of the overall general condition of our patients we estimated the operation risk and carried out classification according to the general condition determined. On the basis of the classification, adopted by the American Association of Anaesthesiologists, our patients fell in the group ASA II/III.

In our methodology we abandoned classic means of pre-medication, particularly if they needed to be applied by injection. Namely, such a method of pre-medication would upset and frighten the children and thus a contra-effect would be achieved. Instead we arranged with the parents and guardian for the patients to take only those medications etc., which were a constituent part of their chronic and usual therapy (anti-epileptics etc.).

We also made great efforts to establish contact and obtain the trust of our patients, so that with our help and frequently in our arms they came to the operation table quietly and relaxed.

We introduced general anaesthesia by the principle of inhalation. One of the methods for introducing general anaesthesia was carried out as follows: after we had sat or laid the patient down on the operation table, we attempted to bring the anaesthesiological mask closer, in such a way that first we put it on ourselves or on the parents/guardian. Initially we only used a mixture of oxygen and nitric oxide. After ten inhalations we included 0.5-1% concentration of halothane. We then told the patient that he/she would smell "a kind of smell" explaining that this came from his "diseased teeth". After this we told the patient that we had already treated one tooth and that we were starting on the second. We then increased the inspiration concentration of halothane to 2%, telling the patient that the second and third tooth had been treated, which convinced the patient that everything was painless and fast. Breathing becomes physiological and steady. We then told the patient that he/she will slowly fall asleep and that when they wake up that will go home with daddy or mummy.

This is followed by establishing monitoring (pulse, oximetry, ECG) and children's braunila for infusion of crystalloid, eventual pre-operative necessary drugs and early post-operative analgesia. After achieving the necessary depth of anaesthesia we carried out orotracheal intubation. Nasotracheal intubation was rarely performed at the explicit request of the operator, particularly in the case of patients with a small mouth and large tongue, in order to ensure for therapists optimal working conditions.

The depth of the anaesthesia was maintained according to the condition in which the patient tolerated well the endotracheal tube and had appropriate analgesia.

With this technique we quickly achieved rapid introduction into general anaesthesia, optimal surgical conditions and rapid waking from anaesthesia, with no anaesthesiological complications. After two-hour observation our patients usually go home, firmly convinced that nothing happened (19-22).

After achieving optimal conditions for work in the oral cavity, we performed dental treatment of our patients. For the majority of these patients we were unable to carry out a basic dental examina-

tion prior to the operation, which would have enabled a detailed diagnosis and therapy plan. Thus this was done as soon as they were "anaesthetised", immediately before intervention. At that time and during the operation we were able, when necessary, to take intraoral X-rays by means of the mobile X-ray apparatus.

Initially we carried out completely conservative, and later restorative, and finally surgical, therapy. All the operations performed were conclusive, due to the fact that every temporary therapy solution would require repeated anaesthesia.

## Results

During the last twenty years, from 15th December 1982 up until the end of 2002, we treated 680 patients. Of this number 379 were male (55.78%) and 301 female (44.26%). All the patients were treated during 240 operative days, which means that on average we treated slightly less than three patients (2.83) per operative day.

Analysis of the service provided to these patients shows that initially conservative-surgical operations were prevalent, while later conservative-restorative and prosthetic operations were more frequent. The majority of the services provided were fillings, 2337, either of amalgam or composite (3.43 per patient), 2168 extracted teeth (3.18 per patient) and 147 endodontically treated teeth (0.21 per patient). Other operations amounted to 188 (0.27 per patient) connected with periodontal, surgical and prosthetic operations.

Namely, such a ratio between conservative and surgical operations (1.07:1) would be unacceptable for a healthy population. However, when uncooperative patients are in question, individuals who can only be dentally treated under specific conditions (general anaesthesia), for which there is an unwritten rule that all oral tissues which can be definitely treated in one operation should be treated, while others, which cannot be treated in one therapeutic procedure, should be removed, it can be considered a good result. We treated some of our patients on several occasions, although always with a time interval of at least half a year.

Only six patients, of the earlier aforementioned number, did not fall into "this population". Two, in

whom there was a panic-stricken fear (psycho and pharmaco therapy was attempted), and four in whom hypersensitivity to local anaesthetic was determined. Only eight patients were treated in hospital conditions, 1.17%.

Namely, these patients were high-risk patients who were dentally treated in the ENT theatre of the Clinical Hospital "Firule", Split, because more complex anaesthesiologic conditions were necessary.

After observation (1-2 hours) all the patients treated by us in the Dental Polyclinic, 672 (98.83%) were allowed home or to their institutions. Only a few patients, who lived some distance away from the Polyclinic (Istria, Bosnia & Herzegovina) were accommodated before and after the operation in the Clinical Hospital "Firule" in Split, or with a family here in Split, who are members of an association of the families of handicapped children.

Complications which arose during our work were rare and without serious consequences. They can be divided into those during the operation (perioperative) and those after the operation (postoperative).

Of the perioperative complications in one patient brief interruption in respiration occurred during intubation. We successfully overcame this complication by clearing the respiratory airways, aspirating the secretion in the hypopharynx and assisting ventilation over the ambu balloon.

Another complication occurred in one patient in whom the extracted tooth began to slide towards the hypopharynx. This case was solved by means of a laryngoscope and Maggil tongs.

The third significant complication was the sliding of the steel drill from the shank instrument in the hypopharynx. This case was solved by esophagocopy in the ENT surgical theatre of the Clinical Hospital "Firule", Split.

Of the postoperative complications irritation and vomiting of the patient were successfully resolved by placing the patient in the draining position on his/her hip.

## Discussion

The results achieved during these two decades are the result of dedicated and arduous work of a



team of twenty specialists, dentists and anaesthesiologists who directly care for this dentally demanding population.

However, apart from them mention should also be made of another, no smaller group of physicians; physicians who helped in the pre-operative preparation of our patients, i.e. paediatricians and specialists in school medicine, who care for the general health of this population. We particularly wish to stress the many years of cooperation with Dr. M. Donadini.

We wish to emphasise the importance of comprehensive pre-operative preparation of patients, because occasionally, even after all the aforementioned tests, we have had situations when a patient, planned for operation, was excluded from the programme by the anaesthesiologist, and general anaesthesia postponed until additional examinations and tests had been performed. This was done in order to avoid possible risk situations for our patients, which reduced such situations to the lowest possible degree.

In a small number of formerly uncooperative patients, earlier dentally treated by us under general anaesthesia, we have noticed a positive shift with regard to cooperation. Namely, they now allow a familiar physician or nurse to carry out simple dental interventions in the dental surgery. This important shift in communication can be attributed to the positive experience which these patients experienced during oral treatment under general anaesthesia.

Contrary to Rule et al (23) and Isaac (24), who used intramuscular and intravenous premedication for their patients during oral treatment under general anaesthesia, we used premedication only in exceptional situations. Like Goldman (25) we gave priority to psychophysical treatment of the child and parents, and composed and gentle handling of these patients on the part of the nurses and anaesthesiological technician who participated in this therapeutic procedure.

We carried out dental treatment of the patient, initially conservative, and later surgical in a similar way to cited English authors (23). Consequent-

ly the results which we achieved are very similar to those of the aforementioned authors (23, 24).

## Conclusion

From our many years of experience in the dental treatment of handicapped children and young people, particularly uncooperative patients, we consider that the method of endotracheal anaesthesia for this population is particularly suitable for several reasons:

1. During the operation, which lasts on average around two hours (induction, intervention and wakening) the patient is usually completely treated in one session.
2. By such an anaesthesiological procedure the patient is ensured unobstructed flow/passage through the respiratory airways and there is no fear of aspiration, either of operative material or of small instruments.
3. By inhalation anaesthesia, which we use with well-ventilated lungs, we can relatively quickly achieve the necessary depth of anaesthesia, and also wakening of the patient.

By using the aforementioned anaesthesia we are able, in a short time, to treat many patients and after wakening to send them immediately home or to their institutions. Thus, hospitalisation is unnecessary.

## Collaborators:

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### *Oral surgeons*

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